FIG. 1

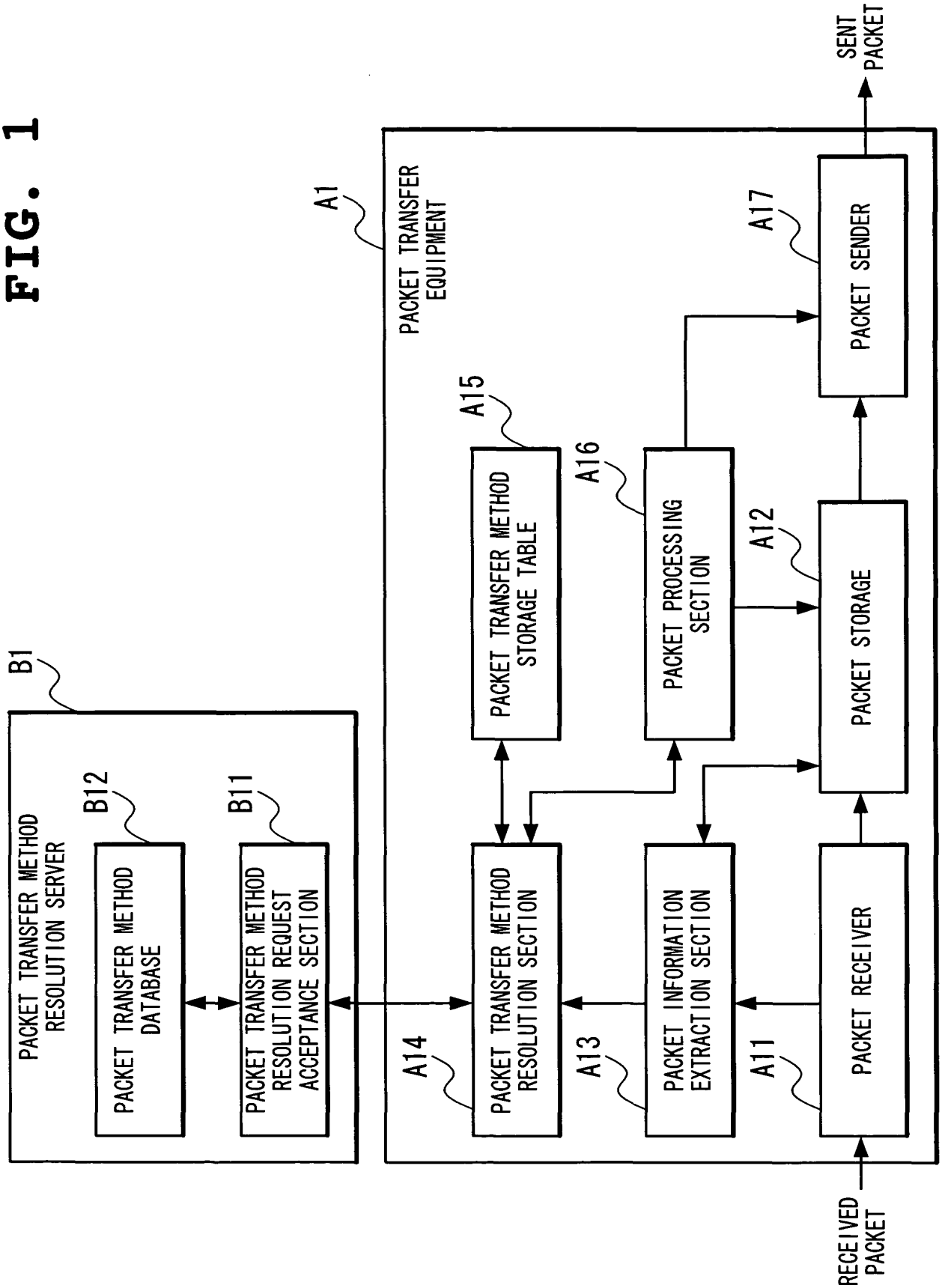
A1
PACKET TRANSFER EQUIPMENT
SENT PACKET
RECEIVED PACKET
A17
PACKET SENDER
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A12
PACKET STORAGE
A14
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
B1
PACKET TRANSFER METHOD RESOLUTION SERVER
B12
PACKET TRANSFER METHOD DATABASE
B11
PACKET TRANSFER METHOD RESOLUTION REQUEST ACCEPTANCE SECTION

FIG. 2

101

INPUT PACKET INFORMATION			TRANSFER METHOD			
DESTINATION IP ADDRESS	DESTINATION PORT No.	VLAN-ID	DESTINATION IP ADDRESS	DESTINATION PORT No.	DESTINATION MAC ADDRESS	OUTPUT PORT
10.1.1.1	80, 8080	100	10.2.2.2	—	0x00:ab:da:32:45:67	1
20.2.2.2	7070	200	—	8080	0x00:da:cf:12:34:56	2
. . .	. . .	. . .	. . .	. . .	. . .	. . .

FIG. 3

102

INPUT PACKET INFORMATION			TRANSFER METHOD					
DESTINATION IP ADDRESS	DESTINATION PORT No.	VLAN-ID	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	DESTINATION PORT No.	DESTINATION MAC ADDRESS	VLAN-ID	MPLS LABEL
20.1.1.1	8080	100	—	20.2.2.2	—	0x00:12:34:56:78:9a	200	
30.1.1.1	7070	200	40.1.1.1	30.3.3.3	80	0x00:bc:de:f0:12:34	—	
40.1.1.1	ARBITRARY	100	—	—	—	—	DELETED	222
...	...	...	...	...	...	...	...	...

Title: PACKET TRANSFER EQUIPMENT, PACKET TRANSFER METHOD RESOLUTION SERVER, DNS SERVER, NETWORK SYSTEM AND PROGRAM
Inventor(s): Norihito FUJITA, et al.
DOCKET NO.: 040405-0364

FIG. 4

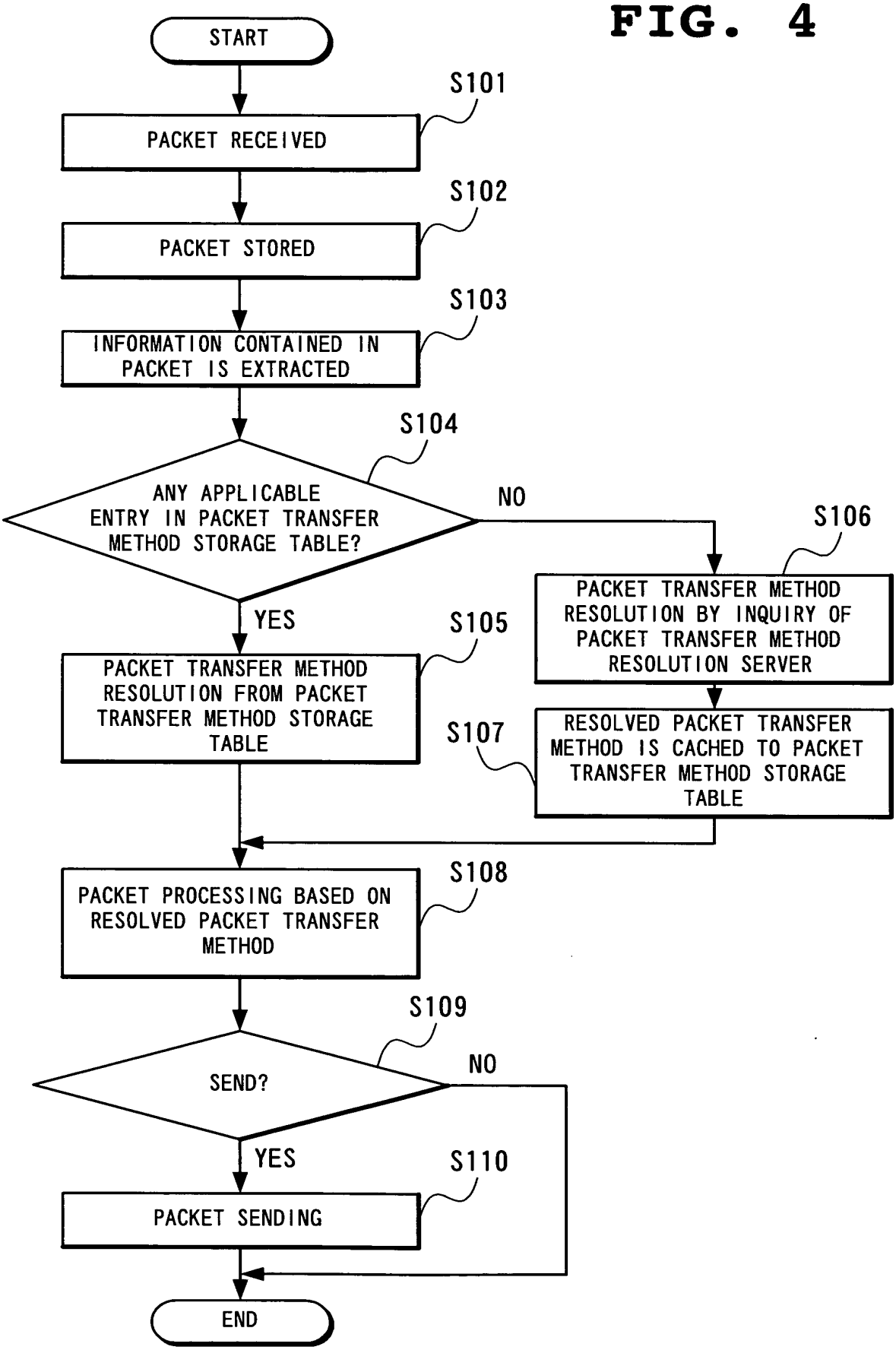
START
S101
PACKET RECEIVED
S102
PACKET STORED
S103
INFORMATION CONTAINED IN PACKET IS EXTRACTED
S104
ANY APPLICABLE ENTRY IN PACKET TRANSFER METHOD STORAGE TABLE?
NO
S106
PACKET TRANSFER METHOD RESOLUTION BY INQUIRY OF PACKET TRANSFER METHOD RESOLUTION SERVER
YES
S105
PACKET TRANSFER METHOD RESOLUTION FROM PACKET TRANSFER METHOD STORAGE TABLE
S107
RESOLVED PACKET TRANSFER METHOD IS CACHED TO PACKET TRANSFER METHOD STORAGE TABLE
S108
PACKET PROCESSING BASED ON RESOLVED PACKET TRANSFER METHOD
S109
SEND?
NO
YES
S110
PACKET SENDING
END

FIG. 5

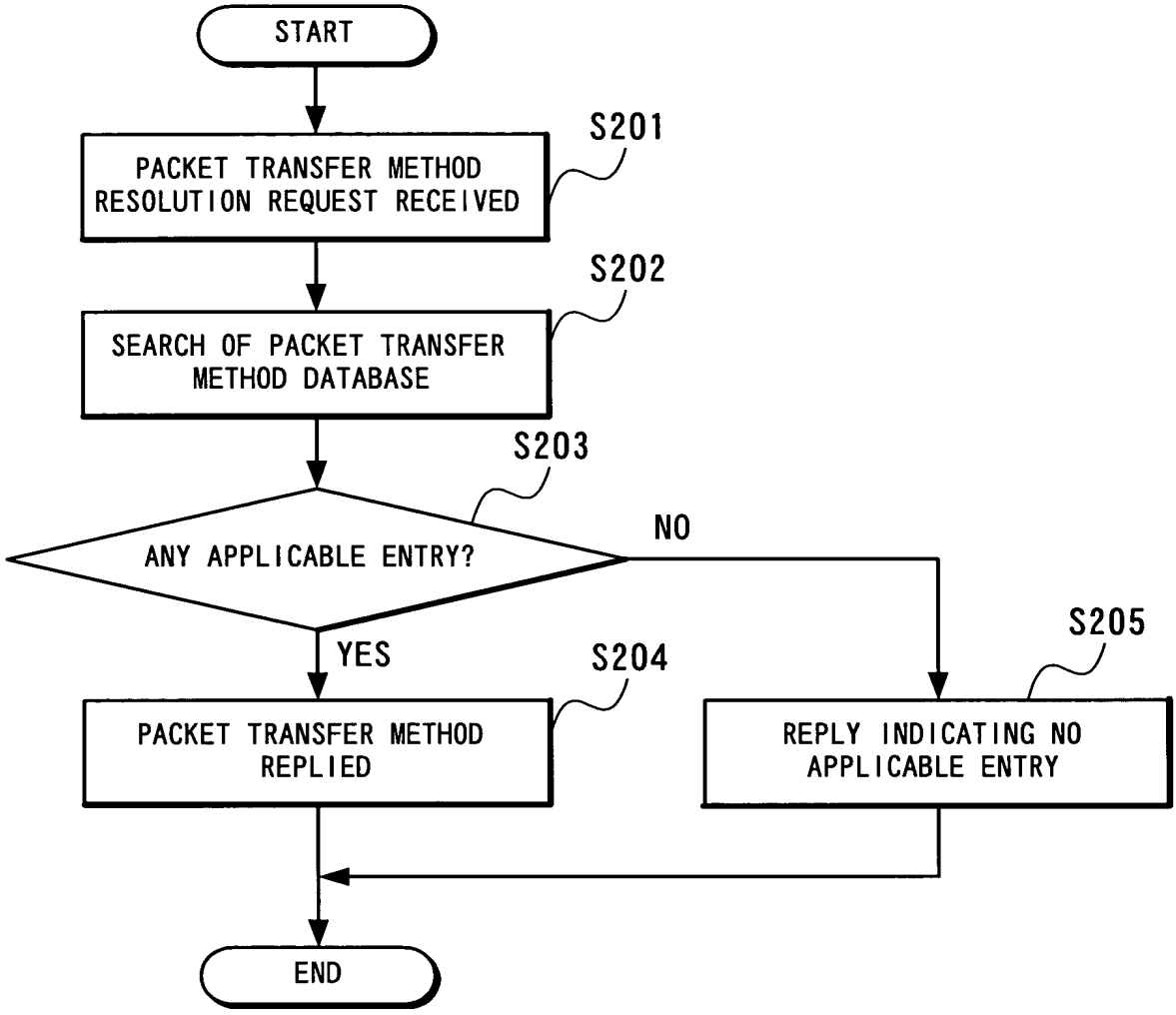
START
S201
PACKET TRANSFER METHOD RESOLUTION REQUEST RECEIVED
S202
SEARCH OF PACKET TRANSFER METHOD DATABASE
S203
ANY APPLICABLE ENTRY?
NO
YES
S204
PACKET TRANSFER METHOD REPLIED
S205
REPLY INDICATING NO APPLICABLE ENTRY
END

FIG 6

RECEIVE PORT	EXTRACTED PACKET INFORMATION
80	URL , COOKIE
OTHER THAN 80	DESTINATION IP ADDRESS, VLAN-ID

FIG. 7

110

INPUT PACKET INFORMATION			TRANSFER METHOD		
URL	DESTINATION IP ADDRESS	VLAN-ID	SOURCE IP ADDRESS	DESTINATION MAC ADDRESS	VLAN-ID
www.aaa.com/*	—	—	50.1.1.1	0x00:12:34:56:78:9a	100
www.bbb.net/*	—	100	50.1.1.1	0x00:bc:de:f0:12:34	200
—	20.30.40.50	200	60.1.1.1	0x00:98:76:54:32:10	200
. . .	. . .	. . .	. . .	. . .	. . .

FIG. 8

111

INPUT PACKET INFORMATION			TRANSFER METHOD				
URL	DESTINATION IP ADDRESS	VLAN-ID	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	DESTINATION PORT No.	DESTINATION MAC ADDRESS	VLAN-ID
www.aaa.com/*	—	—	—	20.2.2.2	—	0x00:12:34:56:78:9a	200
www.bbb.net/*	—	100	40.1.1.1	30.3.3.3	80	0x00:bc:de:f0:12:34	—
—	20.30.40.50	200	60.1.2.3	—	—	0x00:98:76:54:32:10	300
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

FIG. 9

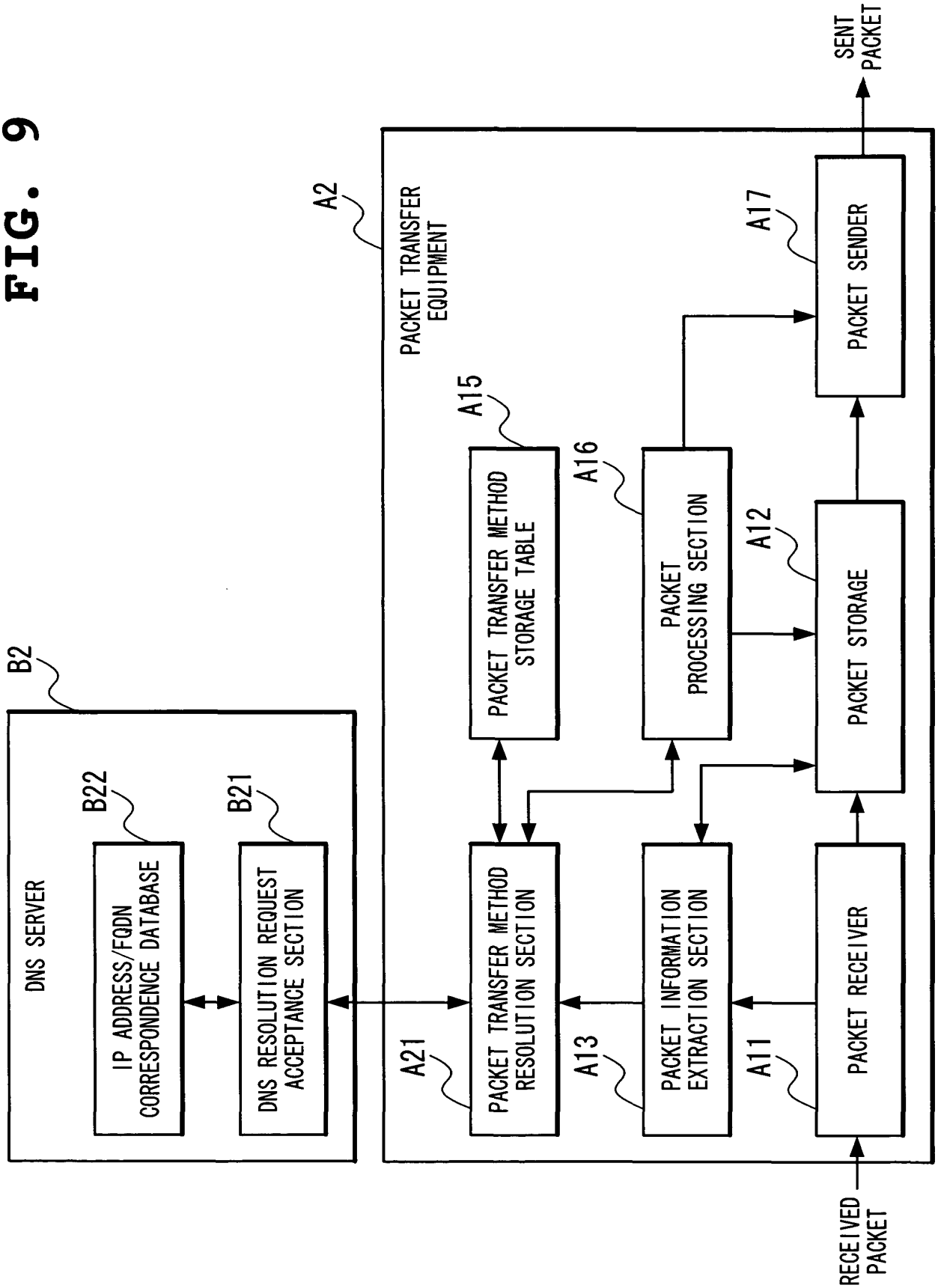
SENT PACKET
A2
PACKET TRANSFER EQUIPMENT
A17
PACKET SENDER
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A12
PACKET STORAGE
B2
DNS SERVER
B22
IP ADDRESS/FQDN CORRESPONDENCE DATABASE
B21
DNS RESOLUTION REQUEST ACCEPTANCE SECTION
A21
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
RECEIVED PACKET

FIG.10

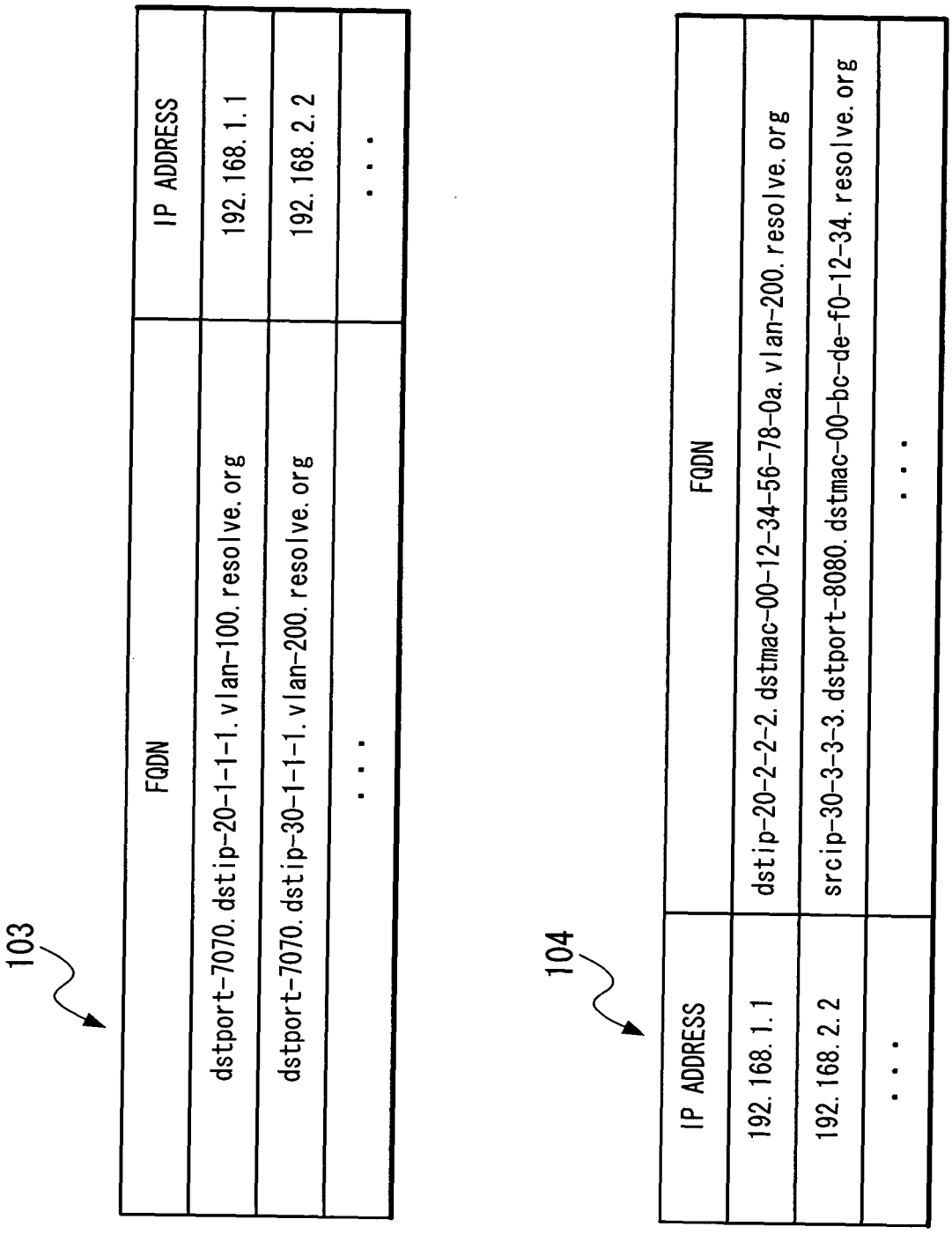
103
FQDN
IP ADDRESS
dstport-7070.dstip-20-1-1-1.vlan-100.resolve.org
192.168.1.1
dstport-7070.dstip-30-1-1-1.vlan-200.resolve.org
192.168.2.2
104
IP ADDRESS
FQDN
192.168.1.1
dstip-20-2-2-2.dstmac-00-12-34-56-78-0a.vlan-200.resolve.org
192.168.2.2
srcip-30-3-3-3.dstport-8080.dstmac-00-bc-de-f0-12-34.resolve.org

FIG. 11

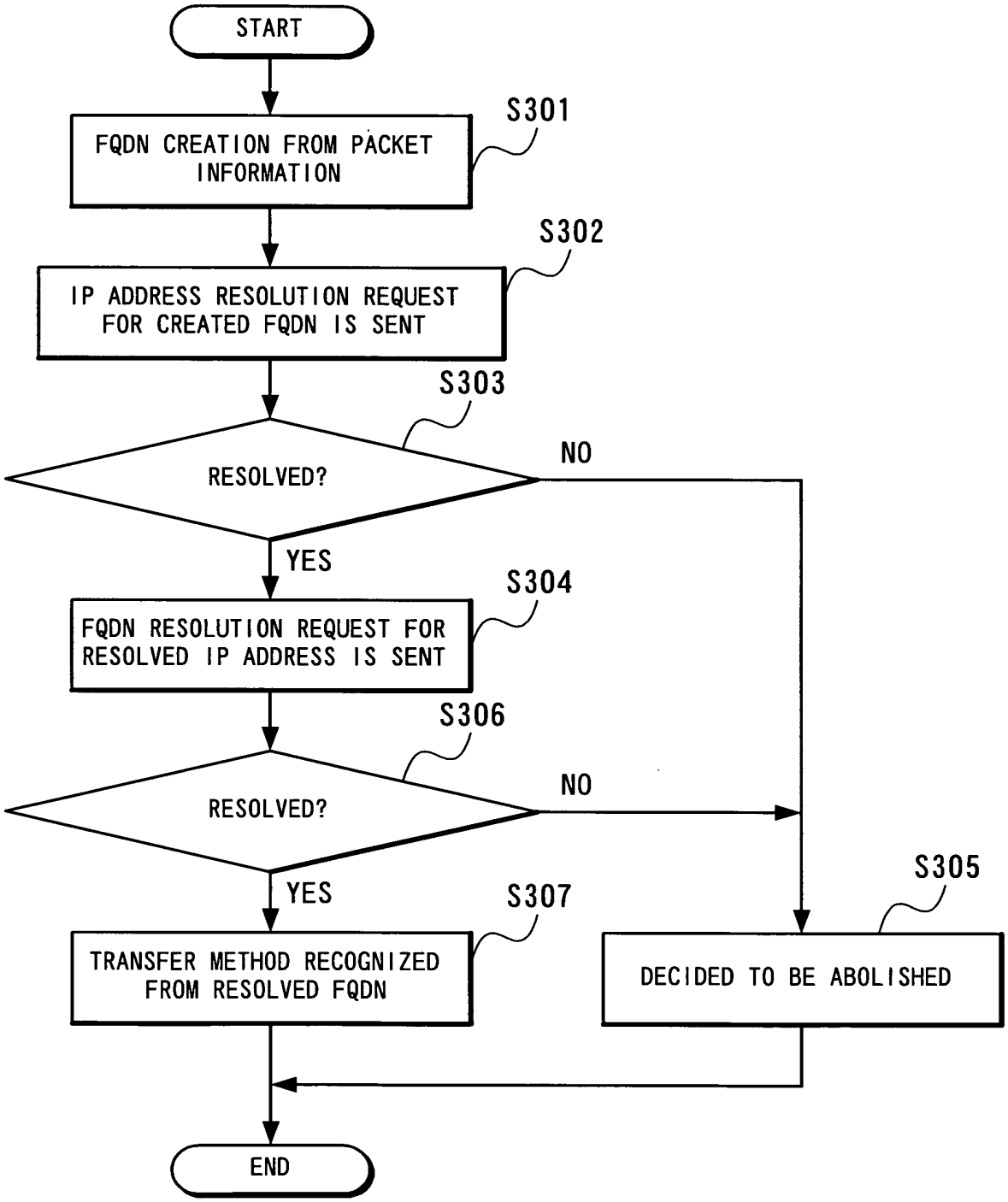
START
S301
FQDN CREATION FROM PACKET INFORMATION
S302
IP ADDRESS RESOLUTION REQUEST FOR CREATED FQDN IS SENT
S303
RESOLVED?
NO
YES
S304
FQDN RESOLUTION REQUEST FOR RESOLVED IP ADDRESS IS SENT
S306
RESOLVED?
NO
YES
S307
TRANSFER METHOD RECOGNIZED FROM RESOLVED FQDN
S305
DECIDED TO BE ABOLISHED
END

FIG. 12

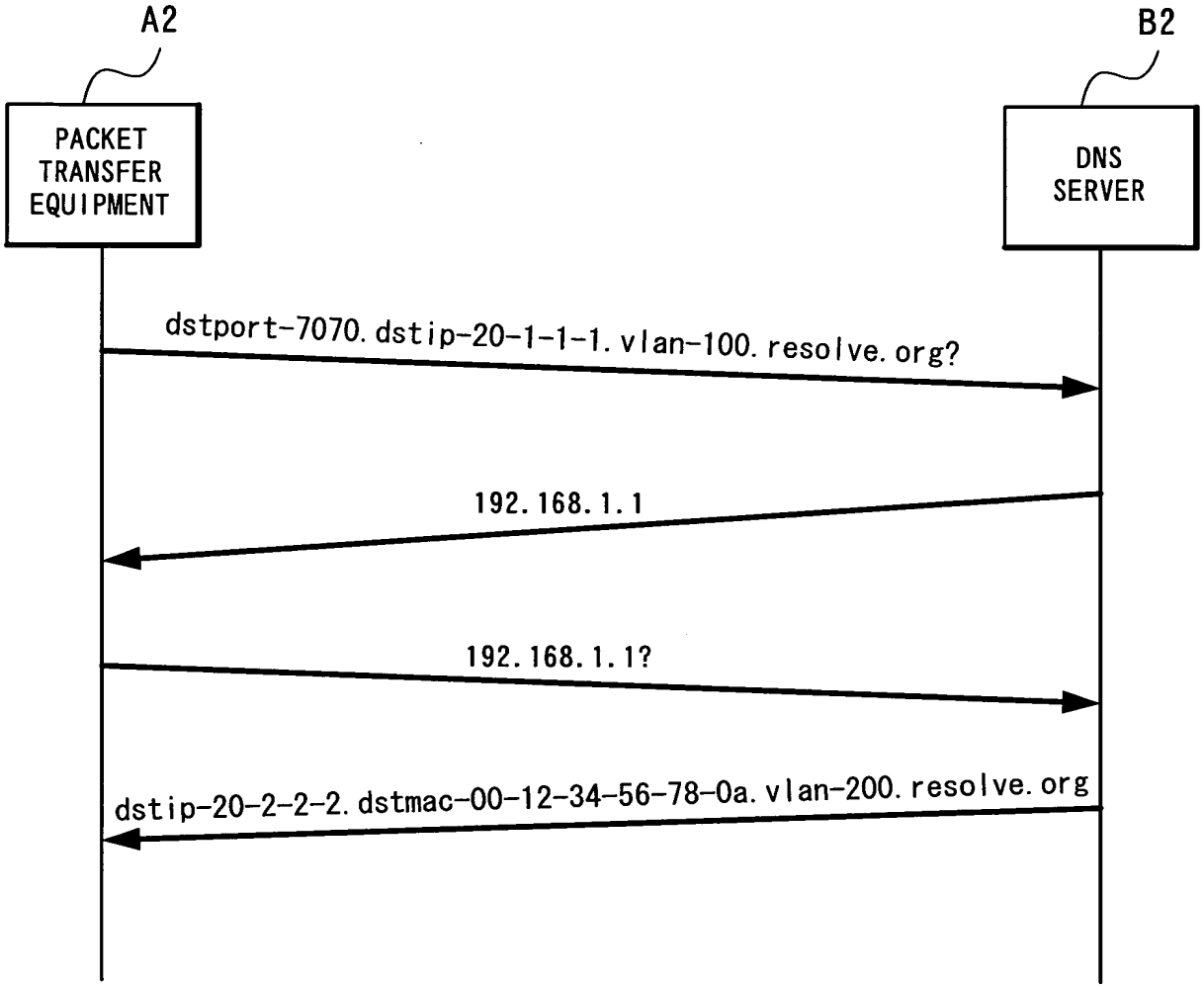
A2
B2
PACKET TRANSFER EQUIPMENT
DNS SERVER
dstport-7070.dstip-20-1-1-1.vlan-100.resolve.org?
192.168.1.1
192.168.1.1?
dstip-20-2-2-2.dstmac-00-12-34-56-78-0a.vlan-200.resolve.org

FIG. 13

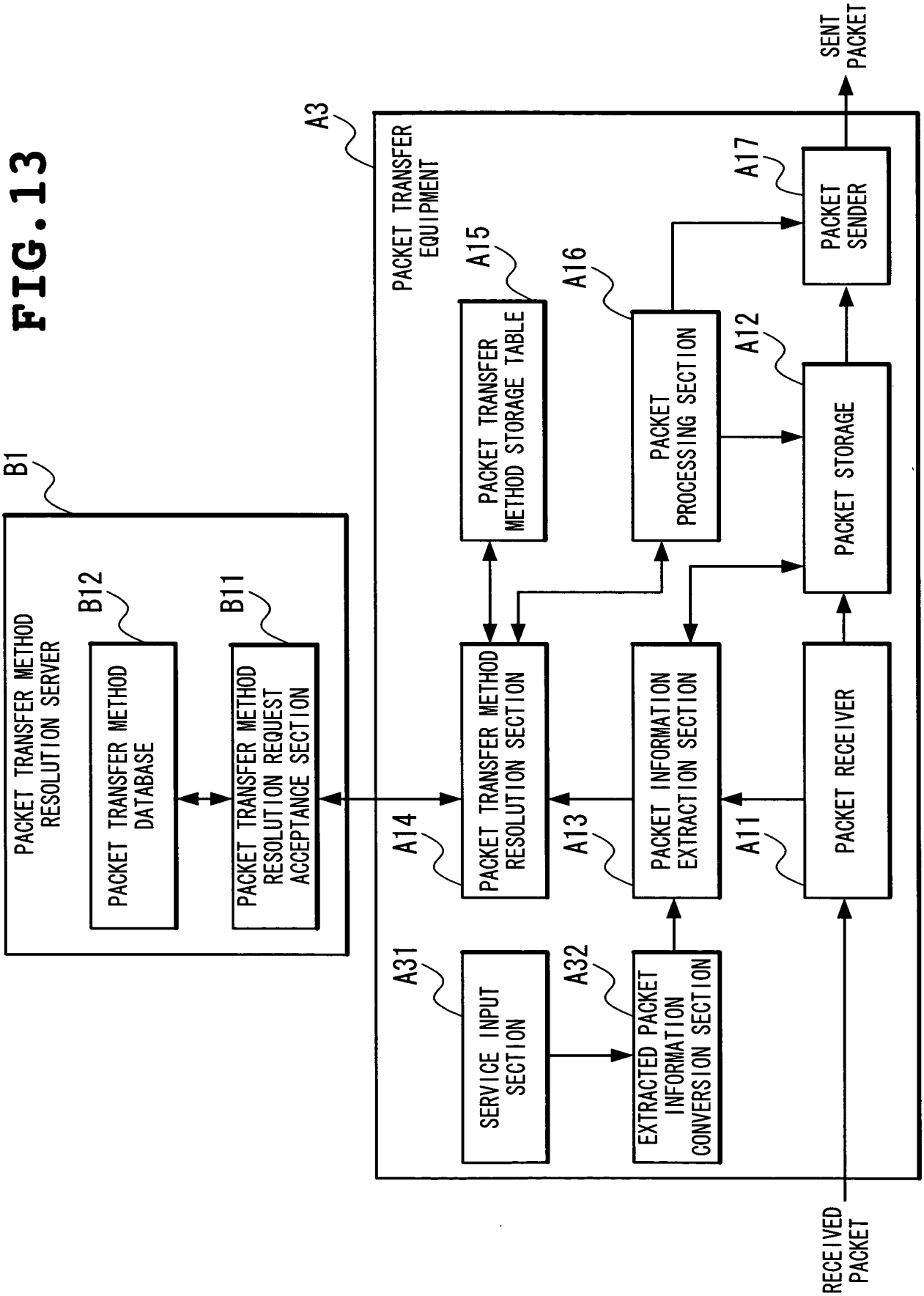
B1
PACKET TRANSFER METHOD RESOLUTION SERVER
B12
PACKET TRANSFER METHOD DATABASE
B11
PACKET TRANSFER METHOD RESOLUTION REQUEST ACCEPTANCE SECTION
A3
PACKET TRANSFER EQUIPMENT
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A17
PACKET SENDER
A12
PACKET STORAGE
A14
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
A31
SERVICE INPUT SECTION
A32
EXTRACTED PACKET INFORMATION CONVERSION SECTION
SENT PACKET
RECEIVED PACKET

FIG. 14

SERVICE	EXTRACTED PACKET INFORMATION
LAYER 2 SWITCH SERVICE	DESTINATION MAC ADDRESS, VLAN-ID
ROUTER SERVICE	DESTINATION IP ADDRESS
LAYER 4 SWITCH SERVICE	DESTINATION TCP/UDP PORT No., DESTINATION IP ADDRESS
LAYER 7 SWITCH SERVICE	URL, COOKIE, SOURCE IP ADDRESS
. . .	. . .

FIG.15

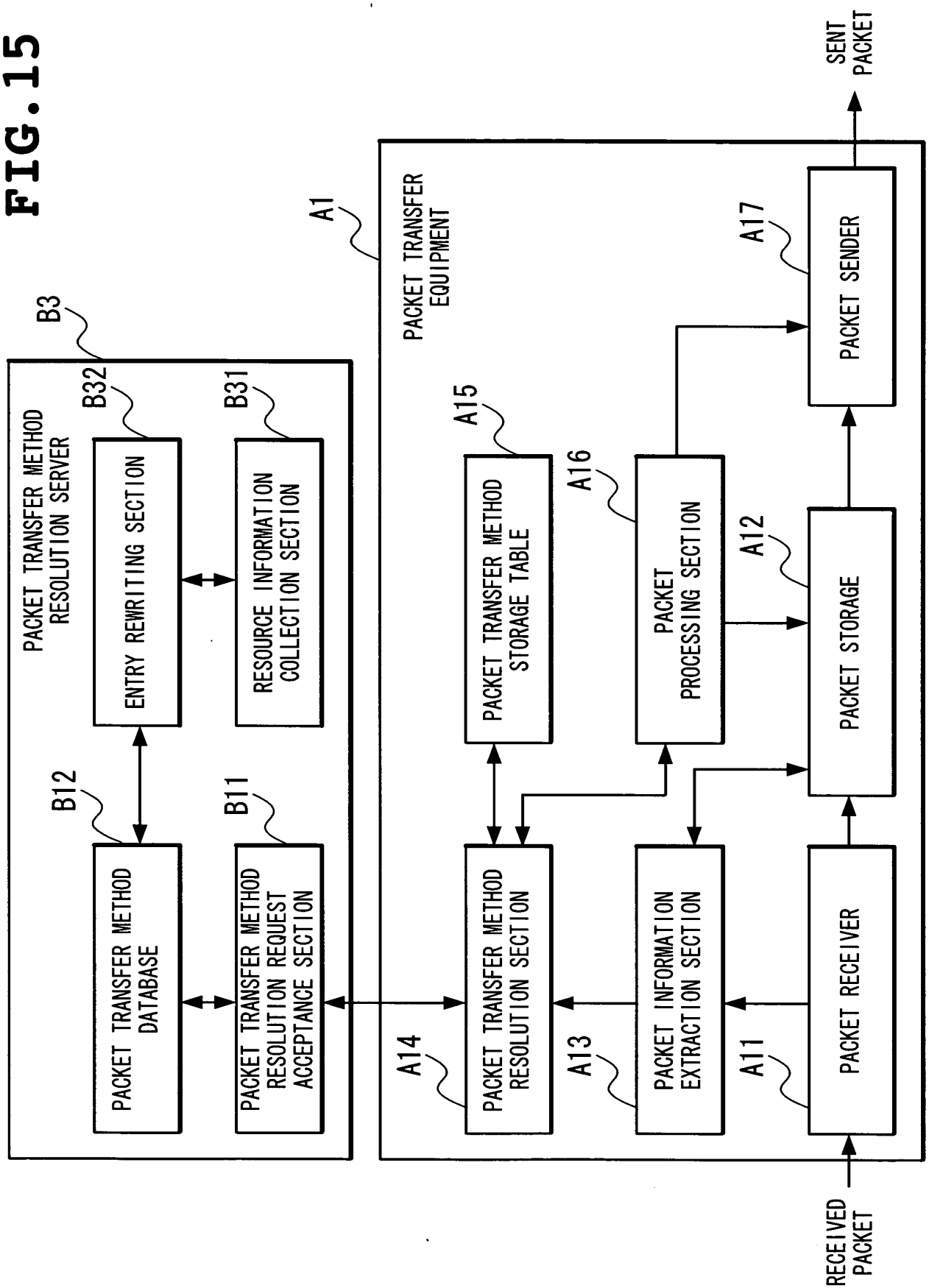
SENT PACKET
A1
PACKET TRANSFER EQUIPMENT
A17
PACKET SENDER
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A12
PACKET STORAGE
B3
PACKET TRANSFER METHOD RESOLUTION SERVER
B32
ENTRY REWRITING SECTION
B31
RESOURCE INFORMATION COLLECTION SECTION
B12
PACKET TRANSFER METHOD DATABASE
B11
PACKET TRANSFER METHOD RESOLUTION REQUEST ACCEPTANCE SECTION
A14
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
RECEIVED PACKET

FIG.16

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INPUT PACKET INFORMATION		TRANSFER METHOD			
URL	RESOURCE REQUEST	URL	DESTINATION IP ADDRESS	DESTINATION MAC ADDRESS	user-priority
www.movie.org/aaa.fmt	IMPORTANCE PLACED ON WIDE DOWNSTREAM BAND	—	20.2.2.2	0x00:12:34:56:78:9a	7
www.text.net/bbb.txt	IMPORTANCE PLACED ON LOW DELAY	www.text.net/ccc.txt	—	0x00:bc:de:f0:12:34	5
...	...	...	...	...	...

FIG.17

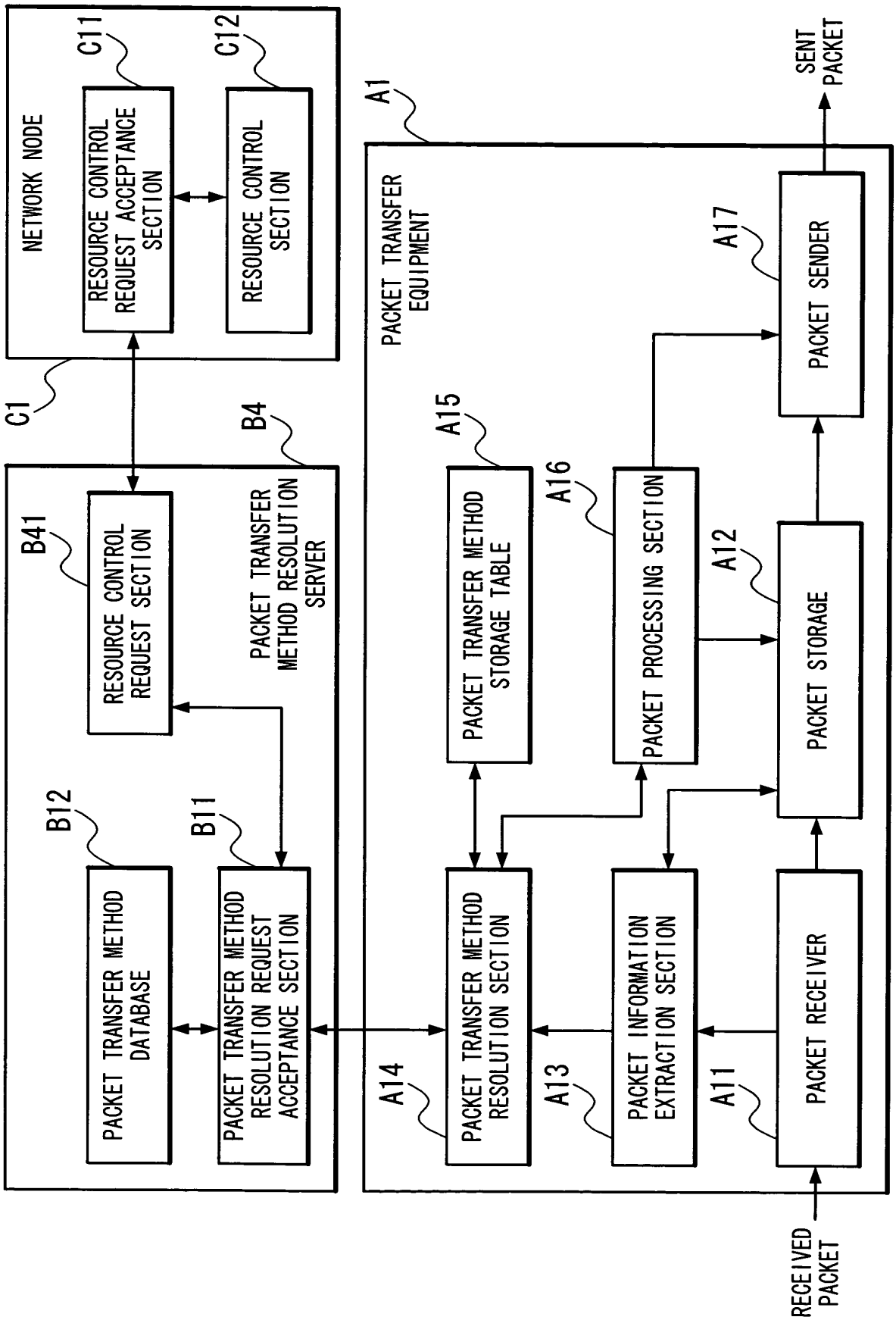
NETWORK NODE
C11
RESOURCE CONTROL REQUEST ACCEPTANCE SECTION
C12
RESOURCE CONTROL SECTION
C1
B4
PACKET TRANSFER METHOD RESOLUTION SERVER
B41
RESOURCE CONTROL REQUEST SECTION
B12
PACKET TRANSFER METHOD DATABASE
B11
PACKET TRANSFER METHOD RESOLUTION REQUEST ACCEPTANCE SECTION
A1
PACKET TRANSFER EQUIPMENT
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A17
PACKET SENDER
A12
PACKET STORAGE
A14
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
SENT PACKET
RECEIVED PACKET

FIG.18

107

INPUT PACKET INFORMATION			TRANSFER METHOD				
SOURCE IP ADDRESS	DESTINATION IP ADDRESS	VLAN-ID	SOURCE IP ADDRESS	MPLS LABEL	DESTINATION MAC ADDRESS	RESOURCE CONTROL	PASSAGE NODE
40.4.4.4	70.7.7.7	100	10.4.4.4	123	—	10 Mbps ASSURANCE	A, B, C
50.5.5.5	80.8.8.8	200	—	234	—	PRIORITY FOR 5 Mbps	A, C, D
60.5.5.5	90.9.9.9	200	10.6.6.6	345	0x00:23:45:67:89:ab	UNNECESSARY	—
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

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DOCKET NO.: 040405-0364

FIG 19

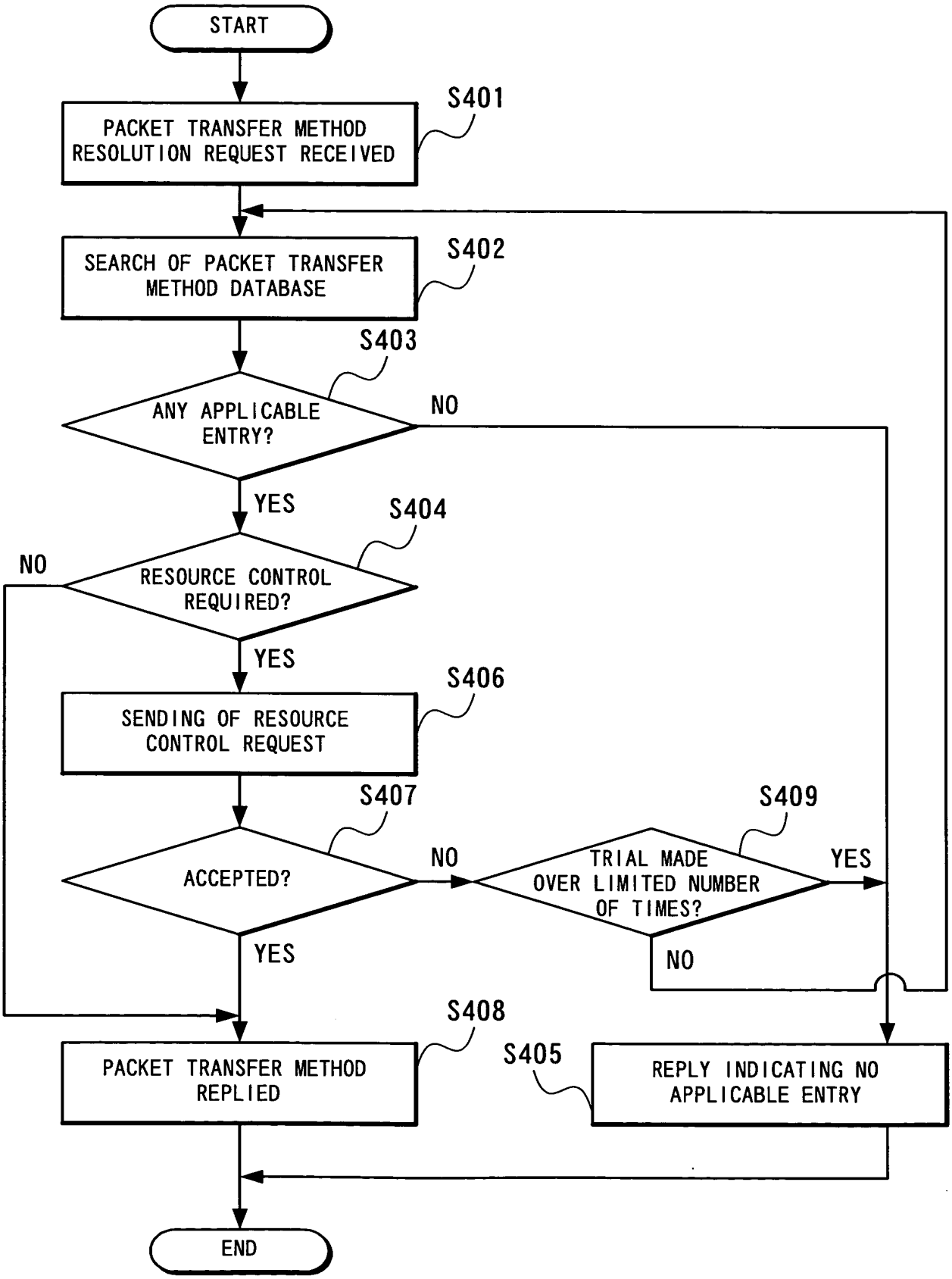
START
S401
PACKET TRANSFER METHOD RESOLUTION REQUEST RECEIVED
S402
SEARCH OF PACKET TRANSFER METHOD DATABASE
S403
ANY APPLICABLE ENTRY?
NO
YES
S404
RESOURCE CONTROL REQUIRED?
NO
YES
S406
SENDING OF RESOURCE CONTROL REQUEST
S407
ACCEPTED?
NO
S409
TRIAL MADE OVER LIMITED NUMBER OF TIMES?
YES
NO
YES
S408
PACKET TRANSFER METHOD REPLIED
S405
REPLY INDICATING NO APPLICABLE ENTRY
END

FIG.20

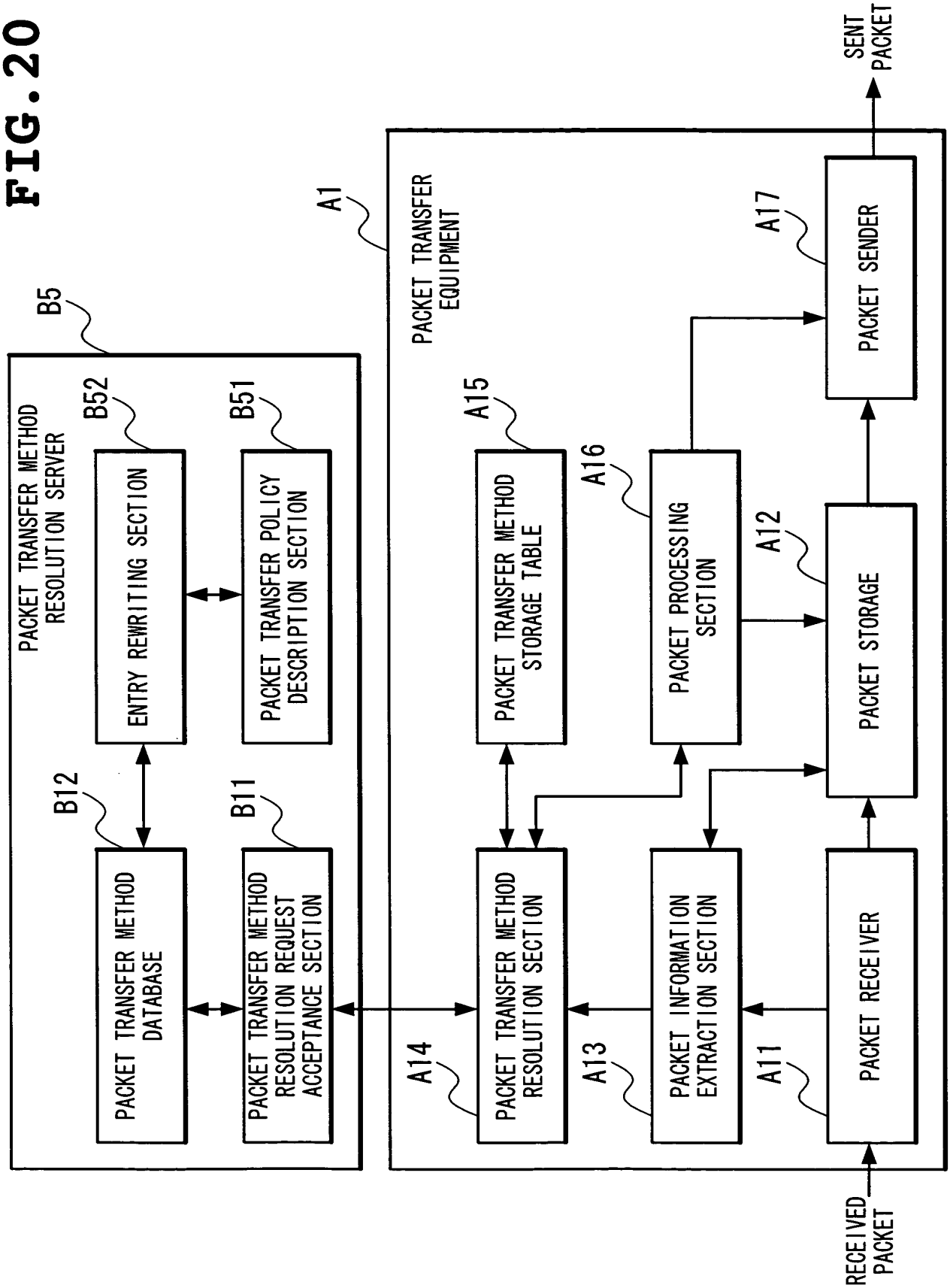
PACKET TRANSFER METHOD RESOLUTION SERVER
B5
B52
ENTRY REWRITING SECTION
B51
PACKET TRANSFER POLICY DESCRIPTION SECTION
B12
PACKET TRANSFER METHOD DATABASE
B11
PACKET TRANSFER METHOD RESOLUTION REQUEST ACCEPTANCE SECTION
A1
PACKET TRANSFER EQUIPMENT
A15
PACKET TRANSFER METHOD STORAGE TABLE
A16
PACKET PROCESSING SECTION
A17
PACKET SENDER
A12
PACKET STORAGE
A14
PACKET TRANSFER METHOD RESOLUTION SECTION
A13
PACKET INFORMATION EXTRACTION SECTION
A11
PACKET RECEIVER
SENT PACKET
RECEIVED PACKET

FIG.21

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INPUT PACKET INFORMATION		TRANSFER METHOD			PACKET TRANSFER POLICY
URL	DESTINATION PORT No.	URL	DESTINATION IP ADDRESS	DESTINATION VLAN-ID	
www.portal.com	80	www.biglobe.net	20.1.1.1	100	TRANSFER WITH PRIORITY UP TO 1000 TIMES
www.abc.org	8080	www.xyz.com	30.1.1.1	—	TRANSFER AT PROBABILITY OF 60%
. . .	. . .	. . .	. . .	. . .	. . .

FIG.22

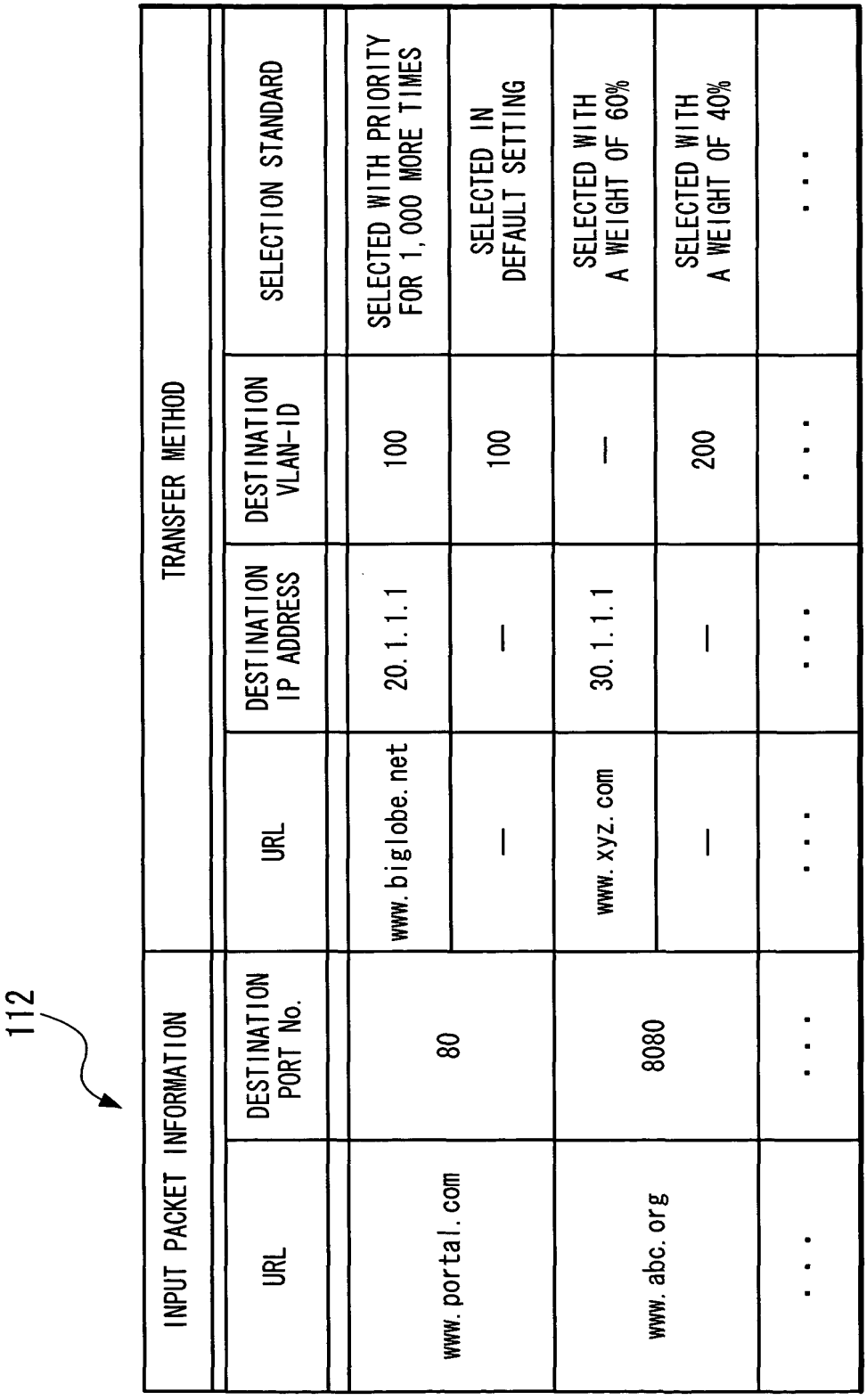
112
INPUT PACKET INFORMATION
TRANSFER METHOD
URL
DESTINATION PORT No.
URL
DESTINATION IP ADDRESS
DESTINATION VLAN-ID
SELECTION STANDARD
www.portal.com
80
www.biglobe.net
20.1.1.1
100
SELECTED WITH PRIORITY FOR 1,000 MORE TIMES
—
—
100
SELECTED IN DEFAULT SETTING
www.abc.org
8080
www.xyz.com
30.1.1.1
—
SELECTED WITH A WEIGHT OF 60%
—
—
200
SELECTED WITH A WEIGHT OF 40%
. . .
. . .
. . .
. . .
. . .
. . .

FIG.23 (PRIOR ART)

TYPE OF INFORMATION CONTAINED IN PACKET / TYPE OF INFORMATION RELATED TO TRANSFER METHOD	1 TYPE (FIXED)	1 TYPE (DETERMINED FOR EACH PACKET)	SEVERAL TYPES (FIXED)	SEVERAL TYPES (DETERMINED FOR EACH PACKET)
1 TYPE (FIXED)	A	E	I	M
1 TYPE (DETERMINED FOR EACH PACKET)	B	F	J	N
SEVERAL TYPES (FIXED)	C	G	K	O
SEVERAL TYPES (DETERMINED FOR EACH PACKET)	D	H	L	P